REMARKS

Claims 1-20 are pending in the application. Claims 1 and 16 have been amended.

Claim Rejections

In the Final Office Action, claims 1-10 and 12-20 were again rejected under 35 U.S.C. §102(e) as being anticipated by Chu et al. (US Pregrant Publication 2005/0074946; "Chu"). Claim 11 was again rejected under 35 U.S.C. §103(a) as being unpatentable over Chu in view of Williams et al. (US US Pregrant Publication 2004/0020894; "Williams").

As noted previously, the pending claims relate to chemical vapor deposition and biased etch back processes that replace fluorine-based etchants with hydrogen. In particular, the claims are directed to a high density plasma chemical vapor etch-enhanced gap fill process using hydrogen as an etchant that can effectively fill high aspect ratio, narrow width gaps while reducing or eliminating dielectric contamination by etchant chemical species. The claimed process involves a multi-step deposition, etch back and deposition process that have separate and distinct deposition and etch operation(s). The deposition operations use a deposition chemistry comprising a silicon-containing dielectric precursor, for example silane (SiH_4). The etch operation(s) use etch process chemistry that is free of silicon-containing dielectric precursor and "consisting essentially of" hydrogen.

Chu also relates to a gap fill process, but the stated object of the Chu invention is to provide a single step gap-fill process "to avoid the tedious steps in the deposition/etch/deposition methods in the prior art." See paragraph [0009]. Chu describes a single step process chemistry that includes a mixture of hydrogen and helium in a certain ratio to other process gases (paragraphs 0020-0021 and Table 1). As noted by the Examiner, Chu does make reference to the possibility that "the gap-filling process may be completed in multiple steps" in paragraph [0025]. However, in describing the nature of this multiple step possibility in the following sentence of that paragraph, Chu indicates that, "The multiple steps may be performed by repeatedly adjusting process parameters...." Further insight into the disclosed "adjusting process parameters" is provided in claim 8 wherein it is recited that the "percentage of He/H_2 in the total reaction gases [which include deposition gases (i.e., oxide precursor such as silane)] is raised with increase of an aspect ratio of the trench.

Thus, it is respectfully submitted that Chu teaches an adjustment of the deposition process chemistry with an increase in the aspect ratio of the trench. However, Chu never provides a teaching nor a suggestion of an etch operation separate from the deposition operation with etch process specific chemistry that is free of silicon-containing dielectric precursor and "consisting essentially of" hydrogen between deposition operations, as claimed in the present

application. Independent claims 1 and 16 have been amended to clarify that which is and was intended to be claimed by reciting that the etch chemistry is free of silicon-containing dielectric precursor, as opposed to the deposition chemistry which naturally comprises silicon-containing dielectric precursor. It is respectfully submitted that these amendments clarify the distinction between teachings of Chu and the present claims, and do so without narrowing the originally presented claims.

Since Chu provides no disclosure or teaching of a separate etch back step with etch back chemistry free of silicon-containing dielectric precursor, and certainly not one which uses an etch process chemistry consisting essentially of hydrogen, as claimed, it is respectfully submitted that Chu does not anticipate the present claims and withdrawal of the rejection of claims 1-10 and 12-20 under 35 U.S.C. §102(e) is respectfully requested.

With regard to claim 11, Williams is relied upon for its teaching regarding RF inductively coupled plasma. However, it is respectfully submitted that Williams does not overcome the noted deficiencies of Chu with regard to the claimed invention, and withdrawal of the rejection under 35 U.S.C. §103(a) is also respectfully requested.

Information Disclosure Statement

An supplemental Information Disclosure Statement (IDS) accompanies the filing of this Request for Continued Examination (RCE). A copy of the IDS and associated PTO Form 1449 accompany this facsimile filed RCE. The formal IDS, together with the required copies of the references cited is being filed concurrently by the Certificate of Mailing procedure. Entry of this IDS and consideration of the cited references is respectfully requested.

Conclusion

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below. If any additional fees are due in connection with

the filing of this amendment, the Commissioner is authorized to charge such fees to Deposit Account 500388 (Order No. NOVLP090).

Respectfully submitted,
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